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Amaral et al.

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(54) **RADIALLY PRESSURE BALANCED FLOATING SEAL SYSTEM**

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(57) **ABSTRACT**

A radially pressure balanced floating seal system is used to seal a rotating shaft, such as a drive shaft in a torpedo, or other type of vehicle or machinery. The radially pressure balanced floating seal includes an outer seal housing and an inner seal housing that floats with respect to the outer seal housing. The outer seal housing is secured proximate the shaft bearings, for example, in the tail cone of a torpedo. The inner seal housing is secured within an internal recessed region in the outer seal housing, and two or more discrete torque members or one distributed torque member extend from the outer seal housing to the inner seal housing to prevent rotation of the inner seal housing while allowing movement generally in a radial direction. The inner seal housing includes a lubricant recess formed within an internal annular aperture of the inner seal housing for containing lubricant. Double canted O-rings are disposed on each side of the lubricant recess in double canted O-ring grooves. The double canted grooves and O-rings prevent unbalanced radial forces that might cause rubbing of the shaft against the seal housing. In one embodiment, the lubricant recess is double canted to also minimize the sealing length.

14 Claims, 5 Drawing Sheets